REMARKS

The applicant has amended independent claims 1 and 17, and dependent claim 14. Claim 15 has been canceled without prejudice and claims 1-14 and 16-17 are pending in the application. The amendments to claims 1, 14, and 17 find support, for example, at page 3, lines 12-15, at page 4, lines 4-7, at page 6, lines 8-11, at page 6, lines 24-26, at page 7, lines 5-14, at page 9, lines 1-22, in Figs. 1-2, and in the Abstract. Thus, no new matter has been introduced. Favorable reconsideration of this application is respectfully requested in light of the above amendments and the following detailed discussion.

Claim Rejections – 35 U.S.C. § 103

1. The Examiner has rejected claims 1-15 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Petri et al. (U.S. Patent No. 5,420,398, hereinafter Petri) or Mannuss et al. (U.S. Patent No. 5,489,764, hereinafter Mannuss) in view of Lanham et al. (U.S. Patent No. 6,037,574, hereinafter Lanham) or Button (U.S. Patent No. 3,610,888, hereinafter Button).

The Examiner asserts that Petri or Mannuss shows a heating assembly including a pan made of a metal, an insulating frame made of a dielectric material, a substrate made of a ceramic material further having a heating element disposed thereon, a temperature sensor, and a control system to regulate the electric current to the heating

element. The Examiner asserts that Petri further shows that the insulating frame is a ring, and Mannuss further shows the pan attached to the cooktop.

The Examiner admits, however, that "neither Petri nor Mannuss shows the thin film conductive coating" disposed on the substrate with at least two bus bars contacting the conductive coating.

Further, the Examiner admits that Petri and Mannuss teach that the heating element that is disposed on the substrate is made of a "thick-film resistor." The Examiner asserts that Lanham shows that it is well known to provide the thick film or thin film coating that is ink printed on a substrate, with bus bars or leads applied to the end portions of the conductive coating to provide the electrical connection to a current source. The Examiner asserts that Button also shows that it is well known to provide a heating element in the form of a thin conductive coating made of metal oxides on a substrate made of a borosilicate to provide a mechanically strong heating device with a good electrical conductivity. The Examiner asserts that Button also shows the bus bars applied to the conductive coating to provide the electrical connection.

The Examiner further alleges that, in view of Lanham or Button, it would have been obvious to one of ordinary skill in the art to adapt Petri or Mannuss with the thin-film conductive coating as an alternative heating element that forms the thick-film heater which provides a good heating element.

The Examiner continues by asserting that with respect to claims 7, 8 and 12, it would have been obvious to one of ordinary skill in the art to apply the heating assembly

taught by Petri and Mannuss, as modified by Lanham or Button, in electrical heating devices including a warming drawer, bread warmer or any other heater devices since Petri and Mannuss leave it to one of ordinary skill to apply its heating assembly to many other electrical heating devices and, furthermore, their heating devices would also have been capable of being used as a warmer drawer, a bread warmer or countertop burners having the substantially same structure as that of the claimed structure.

The Examiner concludes by admitting that with respect to claim 11, while the claimed gap dimension between the substrate and cooktop is "not explicitly disclosed," a gap between the cooktop and substrate is shown in Mannuss. It would have been obvious to provide the claimed gap within the claimed range to allow the heating element to radiate heat to the cooktop as well as to provide the convection heat between the cooktop and the substrate, and the claimed range would have been obvious to keep an optimal heat transfer between the cooktop and the substrate without losing heat if and when such gap is too great.

Applicant, however, has amended independent claims 1 and 17 to require that the heating assembly comprise a sheet of a glass or of a ceramic substrate material, the sheet of substrate material having a major surface with an electrically conductive low emissivity thin film deposited uniformly thereover, the thin film comprising a doped metal oxide, wherein the sheet of substrate material is attached to the insulating frame (claim 1) or the ring (claim 17); and at least two bus bars, the bus bars being disposed onto the doped metal oxide thin film and in electrical contact therewith, the bus bars and electrically conductive thin film being capable of carrying electrical heating currents.

After studying the Petri, Mannuss, Lanham, and Button patents, applicant can find nowhere in these references where these references teach at least the claimed limitations of amended claims 1 and 17.

It is a discovery of the claimed invention to deposit a thin low emissivity (low-E) doped metal oxide thin film uniformly over a major surface of a substrate sheet, which results in a high efficiency heating assembly that is not found in Petri, Mannuss, Lanham, and Button. As specifically detailed at page 9, lines 1-22, applicant has found that the heat generated by the low emissivity thin film does not significantly radiate or conduct downwardly, as viewed in Fig. 1, away from the substrate sheet, as in Petri, Mannuss, Lanham, and/or Button. Instead, the heat generated by the low-E thin film, which is on the opposite side of the substrate sheet from an item to be heated, is directed to the single substrate sheet and, subsequently, efficiently directed toward the item to be heated.

Therefore, in the claimed invention, the low emissivity of the thin film 18 inhibits the radiation of thermal energy in a direction away from the item 42 to be heated, while not requiring the need for a conventional insulating lining and a bottom in the metal pan, thus providing cost savings.

On the other hand, the heater coils and films of Petri, Mannuss, Lanham, and Button direct significant amounts of heat in all (Petri and Mannuss) or both (Lanham and Button) directions and, consequently, are less efficient heaters.

Regarding Petri and Mannuss, this assertion finds support above in the Examiner's concession that these patents teach coils or thick film heaters, which are known to radiate heat in all directions. Applicant can find nowhere in Petri and Mannuss where their coils or thick films possess directional control of heat radiation. In addition, both Petri and Mannuss teach only "serpentine" heaters, not the uniformly deposited thin film of the claimed invention.

Regarding Lanham, applicant finds in Lanham's Summary (column 2, line 38 to column 3, line 22) that Lanham teaches only embodiments that require the heat element to be disposed between first and second quartz substrates, where heat is conducted and radiated in both directions through both substrates. Applicant can find nowhere in Lanham where Lanham teaches a low emissivity thin film, nor does applicant find where Lanham teaches heat radiation and/or heat conduction in only one direction, which is contrary to the claimed invention.

Also, applicant finds that Lanham does not teach that Lanham's films are uniformly deposited on a substrate, which is also contrary to the claimed invention. Instead, applicant finds that Lanham teaches that the heater films are disposed in patterns (for example, "coils" and "serpentine" patterns, or bands, see, for example, Figs. 1-7). It is a discovery of the claimed invention that by uniformly disposing the conductive thin film 18 on the surface 34, the claimed invention results in the heating plate assembly 10 more uniformly supplying heat than conventionally constructed heating assemblies (see, for example, page 6, lines 8-11), like Lanham.

Regarding Button, applicant finds that Button's coatings are not thin films as the Examiner asserts, but are "thick films" as detailed in column 4, lines 59-65, where Button teaches thicknesses from "1 micron to fractions of an inch." It is well known in the art that thin films are those films that are below 1 micron in thickness.

In addition, applicant can find nowhere in Button where Button teaches coatings that are low emissivity thin films, as the claimed invention requires. Thus, all of Button's embodiments radiate or conduct heat in all/both directions, which is contrary to the claimed invention.

Also, applicant can find nowhere in Button where Button teaches doped metal oxide thin films, as the claimed invention requires. Instead, applicant finds that Button teaches "perovskite coatings" (see, for example, the Button Abstract), which are contrary to the claimed invention. Applicant further notes that the perovskite compounds described in Button include roughly equal amounts of non-oxygen components; that is, in the compound ABO_3, A is approximately equal to B. However, one of ordinary skill in the art would not characterize a "doped" metal oxide in this way (i.e., where A is approximately equal to B). Rather, one of ordinary skill in the art would appreciate that in a "doped" compound, dopant levels are typically near or slightly higher than trace amounts of a particular component, by weight percent. In support of this position, applicant attaches Exhibit B hereto, which is a copy of page 425 from Hawley's Condensed Chemical Dictionary – 13th edition, John Wiley and Sons, Inc. (1997), where the word "dope" is defined as "a trace impurity introduced into ultrapure crystals to obtain desired physical properties, especially electrical properties."

Regarding the limitation of a uniformly deposited coating of the claimed invention, applicant finds Button to illustrate "spiral" heating members 32,34 in Fig. 7, but it is not clear to applicant how the coating 14 of Button's embodiment of Fig. 4 is deposited, since applicant can find nowhere in Button where Button illustrates or describes the depositing of the coating 14 as being uniform.

Regarding claim 11, it is also a discovery of the claimed invention that the gap "d" of between 8 to 12 mm allows for good heat transfer between the substrate 14 and the item 42 to be heated, and yet prevents capacitive coupling to a metal cooking container and prevents ionic conductivity through a cooktop substrate (see, for example, page 8, lines 11-17).

Since Mannuss does not "explicitly disclose" the structure of a cooktop that would utilize the Mannuss heating unit, it is not clear to applicant that Mannuss possesses such a gap. Further, applicant can find no disclosure in Mannuss where Mannuss teaches any size for a gap between the bottom of the cooktop and the heating element.

Since claim 15 has been canceled, then the rejection of claim 15 is moot.

Since amended independent claims 1 and 17, and dependent claims 2-14 that directly or indirectly depend from claim 1, require at least the above-stated limitations, then claims 1-14 and 17 are patentable over Petri or Mannuss in view of Button or Lanham, as the inventions defined thereby are not suggested within either Petri, Mannuss, Button, or Lanham, nor is there any suggestion or motivation to modify or

combine these references' teachings in order to teach or suggest the claimed limitations, as required by 35 U.S.C. § 103.

Accordingly, the withdrawal of the rejection of claims 1-14 and 17, and the favorable reconsideration of dependent claims 1-14 and 17 are respectfully requested.

2. The Examiner has rejected claim 16 under 35 U.S.C. 103(a) as being unpatentable over "1-15 and 17" (sic) (applicant assumes that the Examiner meant, Petri or Mannuss in view of Button or Lanham) as applied to claims above, and further in view of Youtsey et al. (U.S. Patent No. 4,032,751, hereinafter Youtsey) or Oberle (U.S. Patent No. 6,194,692, hereinafter Oberle).

The Examiner asserts that Petri or Mannuss in view of Lanham or Button shows the heating assembly claimed except the bus bars made of copper.

However, the Examiner further asserts that Youtsey or Oberle shows that it is well known in the art to provide the bus bars or electrical terminals made of copper. The Examiner asserts that in view of Youtsey or Oberle, it would have been obvious to one of ordinary skill in the art to adapt Petri or Mannuss, as modified by Lanham or Button, with the bus bars made of copper since such material is well known in the art to provide good electrical conductivity.

Applicant asserts that since amended claim 1 is patentable over Petri or Mannuss in view of Lanham or Button, then claim 16, which depends from claim 1, is also patentable, at least on this basis. Also, as noted above, the Examiner admits that Petri or Mannuss in view of Lanham or Button does not disclose copper bus bars, which applicant claims in claim 16.

Furthermore, applicant asserts that copper bus bars, which are capable of carrying electrical heating currents, that are disposed onto the low emissivity doped metal oxide thin film are now limitations required of claim 16. Applicant can find nowhere in Youtsey or Oberle where Youtsey or Oberle teach at least these limitations.

Instead, applicant finds the structure of Youtsey to be "embedded metallic strips 6 and 6' in a carbonaceous pyropolymer layer 4" (see, for example, column 5, line 61 to column 6, line 2). In other words, Youtsey is directed to metallic strips disposed within plastic layers, which is contrary to the structural limitations of the claimed invention.

In addition, the various structural polymer layers and adhesives of Youtsey, which structurally are also utilized to maintain the metallic strips in the pyropolymer layer, would not be utilized for cooking, since outgassing and volatile emissions from the polymer layers and adhesives would at least impart odors to the items being cooked, especially affecting the taste of food that would be warmed and/or cooked by the claimed invention.

Regarding Oberle, the applicant finds the structure of Oberle to be "metallic foil or ink" electrodes 18 disposed on an insulating layer 20 that is disposed on an element 16 (see, for example, Fig. 2 and column 5, line 62 to column 6, line 6). In other words, Oberle is directed to metallic foils or inks being structurally disposed "within" plastic layers. Oberle is also contrary to at least the limitations of the claimed invention, where copper bus bars, which are capable of carrying electrical heating currents, are disposed onto the low emissivity doped metal oxide thin film.

Furthermore, Oberle teaches vehicle seat heaters (see, column 1, lines 7-10). The thermoplastic layers and adhesives 14, 16, 20 of Oberle (see, for example, column 2, lines 29-32 and lines 40-44) would not be capable of carrying electrical heating currents as the claimed invention requires. Oberle would not be utilized to warm or heat various food items, since outgassing and volatile emissions from the thermoplastic layers and adhesives would at least impart odors to the items being warmed or cooked, especially affecting the taste of food that would be warmed and/or cooked by the claimed invention.

Additionally, amended independent claim 1, from which claim 16 depends, requires at least the limitations of the bus bars being capable of carrying electrical heating currents. It is known in the art that metal strip and foil suppliers, like the 3M Corporation of St. Paul, Minnesota, provide metal strips and foils for "grounding and EMI (electro-magnetic interference) shielding in equipment, components, and shielded rooms," and to dissipate static electrical charge built up (see Exhibit A, which accompanied applicant's June 27, 2005 Amendment), as the applicant discloses in the present application. Applicant can find nowhere in the art where such metal foils or strips are recommended by foil suppliers or others for carrying electrical heating currents sufficient to warm or cook a food item.

Applicant's experience has shown that the adhesives utilized by the metal foils deteriorate when large electrical currents sufficient to warm and cook the food item are applied to the metal strips and foils in multiple plastic layered structural applications (like Youtsey and/or Oberle) which results in electrical arcing. Also, the adhesives utilized by

the metal strips and foils evaporate when used in cooking applications which result in poor electrical connection and poor cooking of items.

Therefore, claim 16 is patentable over Petri or Mannuss in view of Button or Lanham and further in view of Youtsey or Oberle, as the inventions defined thereby are not suggested within either Petri, Mannuss, Button, Lanham, Youtsey, or Oberle, nor is there any suggestion or motivation to modify or combine these references' teachings in order to teach or suggest the claimed limitations, as required by 35 U.S.C. § 103.

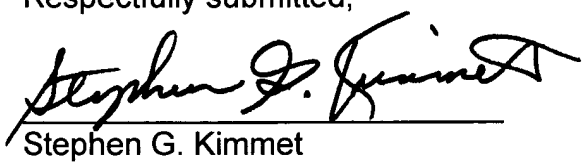
Consequently, the applicant respectfully submits that claim 16 should be allowed over Petri, Mannuss, Button, Lanham, Youtsey, or Oberle. Accordingly, withdrawal of the rejection of claim 16 and favorable reconsideration of claim 16 are respectfully requested.

CONCLUSION

For all the reasons described in the preceding paragraphs, applicant respectfully submits that the present application is now in condition for allowance. Accordingly, a timely action to that end is courteously solicited.

If the Examiner has any remaining questions or concerns, or would prefer claim language different from that included herein, the favor of a telephone call to the applicant's attorneys is requested.

Respectfully submitted,



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